CLAIMS

1. A substrate comprising

a metal plate, and

an insulating film, which is provided on the surface of the metal plate and which includes needle alumina particles and granular particles.

2. The substrate of claim 1, wherein the granular particles include at least one of silica particles, MgO particles, and TiO_2 particles.

3. The substrate of claim 2, wherein the granular particles include silica particles.

4. The substrate of one of claims 1 to 3, wherein the needle alumina particles have an aspect ratio of 6 to 15.

5. The substrate of claim 4, wherein the needle alumina particles have a major-axis length of 70 nm to 300 nm.

6. The substrate of one of claims 1 to 5, wherein the granular particles have a mean particle size of 5 nm to 80 nm.

7. The substrate of one of claims 1 to 6, wherein the insulating film includes 0.3 mass% to 80 mass% of the needle alumina particles.

8. The substrate of one of claims 1 to 7, wherein the insulating film has a thickness of 0.3 μm to 3.5 μm.

9. The substrate of one of claims 1 to 8, wherein the insulating film has a surface roughness of 0.3 μm or less.

10. The substrate of one of claims 1 to 9, wherein the metal plate is made of Cu, an Fe-Ni-Cr alloy, an Fe-Cr alloy, an Fe-Ni alloy, Fe or Al.

11. The substrate of one of claims 1 to 10, wherein the metal plate has a thickness of 0.05 mm to 0.5 mm.

12. A wiring board comprising

the substrate of one of claims 1 to 11, and

a wiring pattern that has been formed on the surface of the insulating film on the substrate.

13. A method of making a substrate, comprising the steps of:

preparing a dispersion solution including needle alumina particles and granular particles;

applying the dispersion solution onto a metal plate;

drying the metal plate on which the dispersion solution has been applied; and

baking the metal plate that has been subjected to the step of drying, thereby forming an insulating film on the surface of the metal plate.

14. The method of claim 13, wherein the step of applying the dispersion solution is carried out by a coating process.

15. The method of claim 13 or 14, wherein the dispersion

solution is prepared so as to have a PH of 3.5 to 5.5.

16. The method of claim 15, wherein the dispersion solution includes at least one of formic acid, acetic acid, salts thereof, and ammonia.

17. The method of one of claims 13 to 16, wherein the combined concentration of the needle alumina particles and the granular particles in the dispersion solution is 2 mass% to 6 mass%.

18. The method of one of claims 13 to 17, wherein the granular particles include silica particles.

19. The method of one of claims 13 to 18, wherein the needle alumina particles have an aspect ratio of 6 to 15.

20. The method of one of claims 13 to 19, wherein the granular particles have a mean particle size of 5 nm to 80 nm.

21. The method of one of claims 13 to 20, wherein the insulating film includes 0.3 mass% to 80 mass% of the needle alumina particles.